


PATENT COÖPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 214165/EP/he	FOR FURTHER ACTION		See Form PCT/PEEA416
International application No. PCT/NL2004/000922	International filing date (day/month/year) 29.12.2004	Priority date (day/month/year) 30.12.2003	
International Patent Classification (IPC) or national classification and IPC B23K26/067, B23K26/08, B23K26/38, H01L21/78, H01L21/304, G02B27/10, G02B27/42, G02B3/00, G02B3/08, B23K26/00			
Applicant ADVANCED LASER SEPARATION INTERNATIONAL... et al.			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p style="margin-left: 20px;">a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau a total of 6 sheets, as follows:</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p style="margin-left: 20px;">b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p style="margin-left: 20px;"><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p style="margin-left: 20px;"><input type="checkbox"/> Box No. II Priority</p> <p style="margin-left: 20px;"><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p style="margin-left: 20px;"><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p style="margin-left: 20px;"><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p style="margin-left: 20px;"><input type="checkbox"/> Box No. VI Certain documents cited</p> <p style="margin-left: 20px;"><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p style="margin-left: 20px;"><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 31.10.2005	Date of completion of this report 06.03.2006		
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Jeggy, T Telephone No. +49 89 2399-7341		

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**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

10/585079
AP20 Rec'd PCT/PTO 29 JUN 2006
International application No.
PCT/NL2004/000922

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-3, 6, 7, 9-13	as originally filed
4, 5, 8	received on 01.11.2005 with letter of 31.10.2005

Claims, Numbers

1-13	received on 01.11.2005 with letter of 31.10.2005
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Drawings, Sheets

1-3	as originally filed
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- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

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**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/NL2004/000922

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-13
	No: Claims	
Inventive step (IS)	Yes: Claims	1-10
	No: Claims	11-13
Industrial applicability (IA)	Yes: Claims	1-13
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

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**INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(SEPARATE SHEET)**

PCT/NL2004/000922

Re Item V**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement****V.1 Cited documents**

The following documents (D) are referred to in this communication ; the numbering will be adhered to in the rest of the procedure :

- D1: US-B1-6 635 849 (T. OKAWA ET AL) 21 October 2003 (2003-10-21)
- D2: WO 01/37769 A (Y. AMITAI ; B. SHALEV AND AL) 31 May 2001 (2001-05-31)
- D3: US-A-5 633 735 (R.O. HUNTER JR ET AL) 27 May 1997 (1997-05-27)
- D4: US-A-5 029 243 (H. DAMMAN ET AL) 2 July 1991 (1991-07-02)
- D5: US-A-5 922 224 (J.C.E. BROEKROELOFS) 13 July 1999 (1999-07-13)
- D6: EP-A-0 679 469 (MITSUBISHI ELECTRIC CORP) 2 November 1995 (1995-11-02)
- D7: WO 02/094528 A (KULICKE & SOFFA INVESTMENTS ; R. MANOR) 28 November 2002 (2002-11-28)

V.2 Claims 1-9

D5, which is considered to represent the most relevant state of the art, discloses (Figures 1 and 4 with corresponding passages of the description) a method of separating semiconductor elements (4) on a substrate (1) from which the subject-matter of claim 1 differs by the features and steps defined in the characterising portion of claim 1.

The integration of two different grating orientations in one grating allows a higher precision during the separation of semi conductors elements, in particular during the change of direction of the cutting. After the scoring in one direction using the first diffracting region of the grating, the scoring in the second direction is achieved by moving the grating so that the laser beam impinges on the second diffracting region of the grating. A minimum error level is then introduced during this moving step in comparison with the rotation of the substrate mount. The problem to be solved by the

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present invention may therefore be regarded as to provide a method of separating semi conductors elements on a substrate with a higher precision cutting.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons :

- a- no indication could be found in D5 in order to use a diffracting grating with two different zones so that the cut is of higher precision. D1 describes the use of a stack unit for stocking several diffracting gratings, all of them having only one diffracting zone with a unique grating structure. D2 describes the use of a multi grating plates holding structure, wherein a plurality of different gratings are integrated in it. Each grating has also only one grating structure. The change of grating direction is achieved by displacing the grating holding means. In D2, no precise orientation means is provided between each grating in order to insure a high precision cutting, i.e. the gratings are susceptible to move relative to each other (due to vibrations, reduced tightening load between the holding means and the gratings, ...) during the machining step. D3 describes the use of Fresnel Zone Plate having two different grating structures. D4 describes also the use of a gratings supporting/holding means so that a diffracting direction could be easily changed during machining
- b- no indication is given in D2, D4 or D6 (also using a multiple grating holding structure) for using a single grating having two different grating structures

Claims 2-6 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step (Article 33 (2-3) PCT).

V.3 Claims 7-10

D5, which is considered to represent the most relevant state of the art and to correspond to the prior art known by the applicant on which the preamble of claim 10 is constructed (see Item V.2), discloses (Figures 1 and 4 with corresponding passages of the description) an apparatus for separating semiconductor elements (4) formed on a substrate (1) from which the subject-matter of claim 10 differs by the features of the apparatus defined in the characterising portion of claim 7.

The problem to be solved by the present invention may therefore be regarded as to provide a method of separating semi conductors elements on a substrate with a higher precision cutting. The solution to this problem proposed in claim 7 of the present application is considered as involving an inventive step (Article 33(3) PCT) by following the same argumentation as the one detailed for claim 1 (see Item V.2).

Claims 8-10 are dependent on claim 7 and as such also meet the requirements of the PCT with respect to novelty and inventive step (Article 33 (2-3) PCT).

V.4 Claims 11-13

Either D2 or D6 discloses (the references in parentheses applying to this document) a diffraction grating (Figure 8) suitable for using in a method according to claim 1 (for example), from which the subject-matter of claim 11 differs in that the diffraction grating has a second part having a second grating structure.

This avoids the construction of different grating parts which have to be mounted in a grating holding structure. This allows also the provision of a compacter grating structure comprising several diffracting directions. However, the integration of different grating structures on a same plate has already been employed for the same purpose in a similar grating plates, see document D3 (Figure 2). Indeed, in D3, in order to create different hole patterns onto a substrate, a Fresnel Zone Plate (Figure 2 again), having at least two different zones, is provided. It would be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply these features with corresponding effect to a diffraction grating according to document D2 thereby arriving at a diffraction grating according to claim 11.

Dependent claims 12-13 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT with respect to novelty and/or inventive step (Article 33 (2-3) PCT) ; see D2 for claims 12-13 ; see D6 for claims 12-13.

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